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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/811,023

03/26/2004

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4415-0024

9819

35301

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08/18/2009

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EXAMINER

DANIELS, MATTHEW J

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

08/18/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---------------------------------------|-----------------------------------------|--|
| Office Action Summary | Application No. 10/811,023 | Applicant(s) MATSUMOTO ET AL. | |
| | Examiner MATTHEW J. DANIELS | Art Unit 1791 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-21 is/are pending in the application.
- 4a) Of the above claim(s) 6-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 17-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (US 5,840,347) in view of Gilbert (US 4,521,172) and Murphy (US 6,352,662). **As to Claim 17**, Muramatsu teaches a process for forming a hollow FRP article by internal pressure molding, comprising:

Positioning a FRP prepreg on a periphery of an internal-pressure holding tube (flexible bag capable of sealing, 14:29-20);

Inserting a composite body including the internal-pressure holding tube into a forming die (Fig. 8);

Providing an isolation state where the composite body and forming die do not contact each other (Fig. 8, items 26 and 28)

Clamping the forming die to bring the forming die and composite body into contact with each other (14:33-34) and heating the forming die (14:33-34).

Muramatsu appears to be silent to (a) the vacuum chamber and evacuating during the isolation state, and (b) an application of pressure to an inside of the internal pressure holding tube.

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However, these aspects of the invention would have been obvious over Gilbert and Murphy for the following reasons:

(a) Gilbert teaches a vacuum press having mold halves (2:38-39) in which it is possible to apply vacuum (2:56) and open the molding tool by separating the platens with the ram so as to allow volatiles and air to be removed (2:60-64) (an isolation state) before compression molding (2:19-25). In using the Gilbert process with the Muramatsu hollow article, the Gilbert device would evacuate the vacuum chamber so that air having existed in a space between an outer periphery of the composite body and a periphery of the forming die would implicitly be removed (Gilbert, 2:63). Since it is Gilbert's objective to remove volatiles and air before performing a compression molding process, it is submitted that the evacuation state would be maintained during the subsequent compression molding.

(b) Murphy teaches a process for making a hollow fiber reinforced articles not substantially different from those of Muramatsu including, providing a mandrel (50), wrapping said mandrel (50) with a bladder, wrapping said bladder with a plurality of fiber reinforced prepreg plies (60,62) to form a wrapped assembly, placing said wrapped assembly in a mold (forming die), and pressurizing said prepreg plies by introducing a pressurized gas through said mandrel, and curing said prepreg plies to thereby form said hollow fiber reinforced article (5:21-58).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Gilbert and Murphy into that of Muramatsu for the following reasons:

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(a1) Gilbert's process provides an improvement in the art by its ability to remove air, trapped gases, and volatiles from a resin through the use of a vacuum pumping process prior to molding (2:60-65). One of ordinary skill in the art would have expected the removal of air and volatiles to reduce the number and size of voids or bubbles in the formed article. Since one practicing the method of Muramatsu uses a layered structure (Fig. 8, item 23), trapped air, gases, and volatiles would have been of a similar concern to one using the Muramatsu process. Thus, one would have found it obvious to apply the improvement of Gilbert to the Muramatsu process in order to achieve the same reduction in air, trapped gases, and volatiles, producing an expected reduction in voids, defects, and delaminations.

(a2) Gilbert suggests that the process may be used with rubber or plastics (1:5-6) and that it uses two halves of a molding tool (2:38-40). Thus, because Muramatsu provides a molding tool comprised of two halves and molds plastic, it is submitted that the Muramatsu process is within the scope of those suggested by Gilbert.

(b1) Muramatsu clearly suggests that a pressure should be applied in the inside of the prepreg (14:27-35), and Murphy provides a process and apparatus for applying the suggested pressure to the inside of the prepreg material. Therefore, Muramatsu suggests the process which Murphy provides.

(b2) Muramatsu suggests that expandable material may be used to press the tube outwardly against a mold (14:27-35) and one of ordinary skill in the art at the time of the invention would have recognized the pressurized tube of Murphy as an alternative or substitutable means for achieving the objective of Muramatsu.

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As to Claim 18, Murphy teaches providing a mandrel (50), covering the mandrel (50) with a bladder and wrapping a plurality of fiber reinforced pre-preg plies (60,62) around the bladder to form a wrapped assembly (5:21-58). **As to Claim 19**, Murphy teaches heating and pressurizing said pre-preg plies by introducing a pressurized gas through said mandrel to thereby cure and form said hollow fiber reinforced article (5:21-58). **As to Claims 20 and 21**, Murphy teaches removing said mandrel (50) after wrapping said plurality of fiber reinforced pre-preg plies (60,62) and connecting a source of pressurized gas (52) directly to said bladder (5:39-42 and Figure 3). It is submitted that said pressurized gas source (52), as shown in Figure 5, includes a mouth-piece in order to connect directly to said bladder.

Response to Arguments

2. Applicant's arguments filed 23 April 2009 have been fully considered but they are not persuasive. Applicants' arguments appear to be on the following grounds:

(a) The references do not teach or suggest a method including inserting a composite body including an internal-pressure holding tube and a prepreg into a vacuum chamber containing a forming die, evacuating in an isolation state where the composite and die do not contact, and clamping the forming die after evacuation while maintaining the evacuation state. Muramatsu does not disclose evacuating the vacuum chamber in an isolation state where the composite body and forming die do not contact each other. Muramatsu winds fiber reinforcement on a mandrel to produce a cylindrical intermediate. Fig. 8 is merely a schematic showing the steps and is not intended to show each feature of the invention. Thus, while it appears to show a cylindrical intermediate in a mold where the two do not contact, Muramatsu actually places the cylindrical

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intermediate and expandable substance 27 in a mold. Muramatsu is silent as to the manner of supporting the mandrel within the mold, and is therefore not enabled.

(b) Gilbert separates platens to allow volatiles and air to be removed before compression molding. The vacuum chamber of Gilbert is intended to be used with compression and injection moulding machines, but the instant process is directed to a method for forming by internal pressure molding. One skilled in the art would not look to compression and injection molding machines to solve the problem of air bubbles being trapped between the composite weave and the forming die.

(c) Even if the above is not persuasive, claim 17 recites performing steps in a specific order and at a particular time, which are not taught by the prior art.

3. These arguments are not persuasive of the following reasons:

(a) The Examiner respectfully disagrees with Applicants' position on the Muramatsu generally, and Fig. 8 specifically. The phrase "in a mold" in Muramatsu, as depicted in Fig. 8, clearly teaches or suggests that the phrase appears to mean merely that the mandrel (with composite material) is placed between two dies. It is also respectfully submitted that the ordinary artisan would have recognized how the claimed configuration of Muramatsu (Fig. 8) could have been provided. The reason for the discussion of the cylindrical intermediate is unclear, and it is noted that the composite material is later placed on the forming mandrel (27) in a manner not distinguished from the instant step of "positioning." While it is acknowledged that Muramatsu does not teach specifically whether the pressing process between the dies of Fig.8, items 28

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occurs in air or atmosphere, it is submitted that the art (particularly Gilbert) teaches known reasons why a vacuum environment would have been desirable.

(b) The Examiner submits that Gilbert is analogous under either prong of the analogousness inquiry. Note that the last step of the claimed process (instant Claim 17) is “clamping...to bring said forming die and composite body into contact with each other” and it is unclear why this clamping step is from distinguishable from the compression molding process admitted to be disclosed by Gilbert, which would close and clamp dies closed in order to form a composite body in contact with both dies. Additionally, Applicant's arguments do not appear to point to a reason for evacuating in an isolation state, but it is believed to used for the same reasons as disclosed by Gilbert - to remove bubbles and volatiles. It is, therefore, both pertinent to the particular problem faced by Applicants and within the same field of endeavor.

(c) The order of many or most of the steps recited in Claim 17 does not materially affect the process, and rearrangement into the claimed order, even if not disclosed specifically, would have been obvious. The order of evacuating and clamping the dies together is believed to be the same as disclosed in the Gilbert process, and is obviously performed in order to remove bubbles and volatiles before trapping them between forming dies.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
8/15/09